

3.6 Economic Activity and Value

This section describes current conditions and recent trends in economic activity and value associated with commercial and sport fishing for salmon and steelhead in Puget Sound. Annual average levels of salmon harvest by commercial fishermen and Puget Sound tribes are identified, and the annual average levels of fishing activity and catch by sport fishermen are also presented. The distribution of fishing activity in Puget Sound is described, including the levels of activity that occur in marine waters and fresh waters. The contribution made by salmon and steelhead fishing activity in Puget Sound to the local and regional economy also is described. Sectors of the regional economy that are most affected by fishing activity are described in terms of total sales, employment, and income generated. This information is presented for three multi-county regions that comprise the Puget Sound Action Area: the Strait of Juan de Fuca/North Hood Canal region, North Puget Sound region, and South Puget Sound/South Hood Canal region. In addition to identifying the magnitude and distribution of fishing activity, the value of this activity to persons participating in commercial and sport fishing for salmon and steelhead in Puget Sound is characterized.

Where available, data for the 10-year period between 1991 and 2000 are used to characterize trends in fishing activity and associated economic values; however, in some cases, data are available for only a portion of this time period. More detailed tables of information on fishing activity and associated economic values that include annual levels of salmon harvest and fishing activity between 1991 and 2000 are included in Appendix D to this Environmental Impact Statement, Technical Methods – Economics.

In addition to the value that salmon resources have to commercial and sport fishers and the local and regional economy, it should be recognized that these resources have value to persons that don't directly use or consume the resources. These values are often referred to as non-use or passive use values. Avoiding extinction of endangered species has been recognized as a source of passive use values (Meyer, 1974; Randall and Stoll, 1983; Stoll and Johnson, 1984). Existence values are defined as the benefit received from simply knowing the resource exists even if no use is made of it. Wild stocks of Puget Sound Chinook salmon clearly fit into this definition. As noted by Olsen et al. (1991) in his study of existence value of doubling the size of Columbia River Basin salmon and steelhead runs, "Existence value represents the benefit that individuals gain from the knowledge that doubling of salmon and steelhead runs would provide the runs with greater ecological stability and diversity." Passive use values also are considered public goods, in that the benefits can be simultaneously enjoyed by millions of people all across the region and the country (Loomis, 1996). Although nonuse values associated with

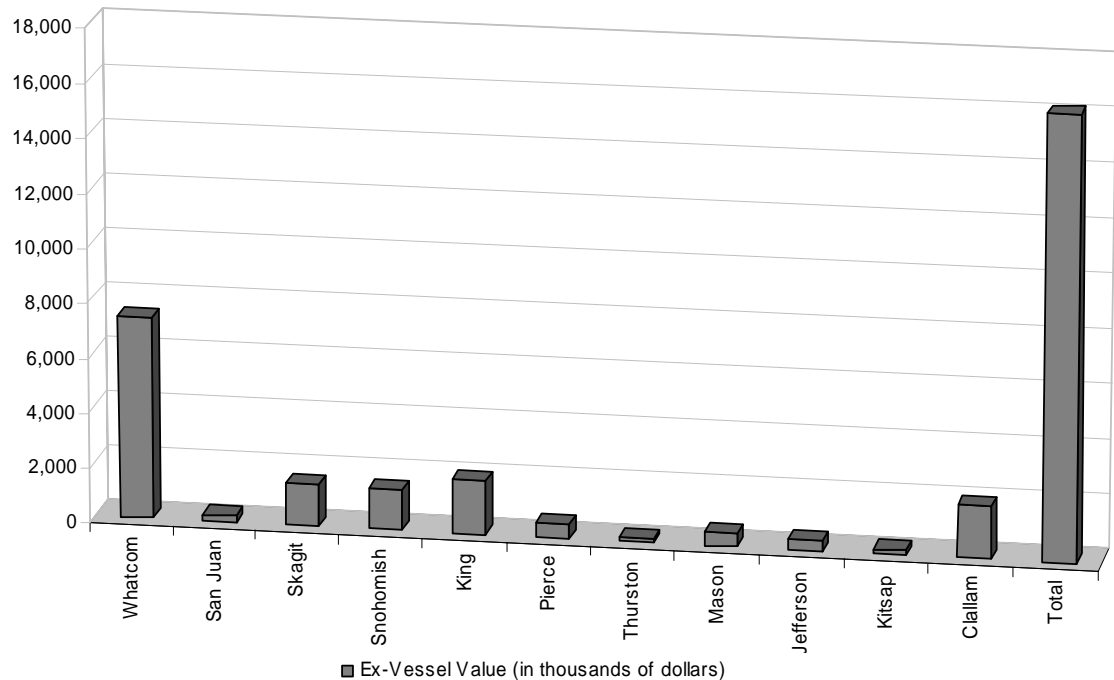
1 | the recovery of listed Puget Sound Chinook salmon are theoretically measurable and likely differ to
2 | some extent between the alternatives, existing data on recovery rates are too limited to reliably estimate
3 | these values.

4 | **3.6.1 Commercial Salmon Harvesting and Processing**

5 | **3.6.1.1 Salmon Harvesting**

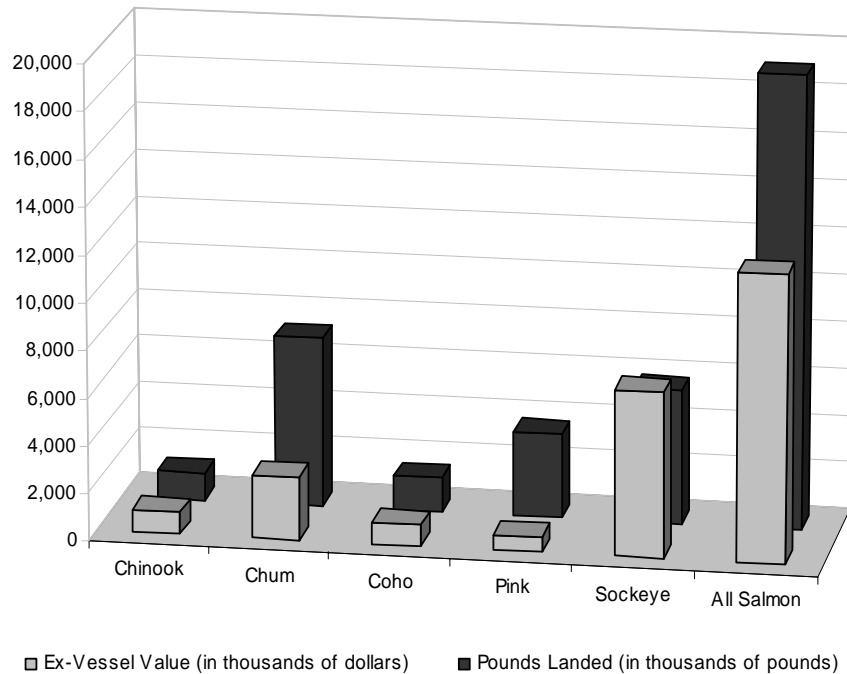
6 | The annual average ex-vessel value (i.e., the dollar value that commercial fishermen receive for their
7 | product once it leaves the fishing vessel) of salmon landed at Puget Sound ports between 1991 and
8 | 1998, is shown by county in Figure 3.6-1. The sources of these landings include salmon harvested in
9 | Alaska, British Columbia, Coastal Oregon, and Washington, in addition to Puget Sound. The average
10 | annual value over the 8-year period was \$16.2 million, with landings in Whatcom County accounting
11 | for about 45 percent of this value (\$7.4 million). Ports in King County and Clallam County contributed
12 | \$1.99 and \$1.94 million, respectively.

1 Figure 3.6-1. Annual average ex-vessel value of commercial salmon landed at Puget Sound ports
2 between 1991 and 1998, by county.



3 The annual ex-vessel value of commercial salmon landings from Puget Sound averaged about \$12.2
4 million between 1991 and 2000 (Figure 3.6-2), or about 75 percent of the annual average value of
5 salmon landings at ports in the Puget Sound area between 1991 and 1998. Landings of sockeye salmon
6 caught in Puget Sound averaged \$7.01 million annually, accounting for more than 57 percent of the
7 average ex-vessel value of all salmon landings. Landings of chum salmon averaged \$2.68 million
8 annually (about 22% of the average annual value). Landings of chinook, coho, and pink salmon, which
9 are only harvested during odd-numbered years, averaged less than \$1.0 million annually over the 10-
10 year period from 1991 through 2000.

1 Figure 3.6-2. Annual average catch (tribal and non-tribal) and ex-vessel value of commercially-caught
2 salmon in Puget Sound between 1991 and 2000.



3 The annual average commercial catch (both tribal and non-tribal) of salmon harvested in Puget Sound
4 is also shown in Figure 3.6-2. In terms of pounds landed, chum salmon accounted for the largest
5 percentage of the salmon harvest, averaging 7.22 million pounds per year over the period 1991 though
6 2000. This share represents about 38 percent of the average annual salmon landings (19.2 million
7 pounds) over the 10-year period. Average annual landings of sockeye salmon accounted for 5.71
8 million pounds (about 30% of the average annual salmon landings), pink salmon accounted for 3.62
9 million pounds (about 19%), coho salmon accounted for 1.47 million pounds (about 8%), and chinook
10 salmon accounted for 1.16 million pounds (about 6%). More than 83 percent of the commercially-
11 caught Puget Sound salmon in 2001 was taken by commercial fishermen using purse seines, and about
12 15 percent was taken by commercial fishermen using gillnets (see Economics Table D-7 in Appendix
13 D).

14 Salmon landings from Puget Sound and the ex-vessel value of these landings decreased substantially
15 over the 10-year period 1991 through 2000 (see Economics Table D-2 in Appendix D). During the
16 period 1991 through 1995, total annual landings averaged about 27.4 million pounds, and the ex-vessel
17 value of these landings averaged about \$18.3 million. Between 1996 and 2000, total annual landings

averaged about 11.0 million pounds, and the ex-vessel value of these landings averaged about \$6.0 million. The decline in landings and ex-vessel value was particularly sharp in 1999 and 2000.

Figure 3.6-3 shows the percentage of the annual average commercial harvest (both tribal and non-tribal) of Puget Sound salmon by Marine Catch Area. (Figure 3.6-4 identifies the geographic boundaries of Marine Catch Areas.) In terms of pounds landed, Marine Catch Area 7 accounted for the largest share of the salmon harvest, averaging 55 percent of the total pounds of salmon landed annually in marine waters of Puget Sound between 1991 and 2000. More than 84 percent of the salmon caught in Marine Catch Area 7 were pink salmon and sockeye salmon (see Economics Table D-3 in Appendix D). Marine Catch Area 12 had the second-largest share of salmon caught, accounting for 17 percent of the 19.34 million pounds landed, on average, between 1991 and 2001. Marine Catch Areas 4, 6, and 9 each accounted for less than 1 percent of the average annual amount of salmon landed in Puget Sound between 1991 and 2000.

Figure 3.6-3. Percent of the annual average commercially-caught salmon in Puget Sound between 1991 and 2000, by marine catch area (in pounds landed).

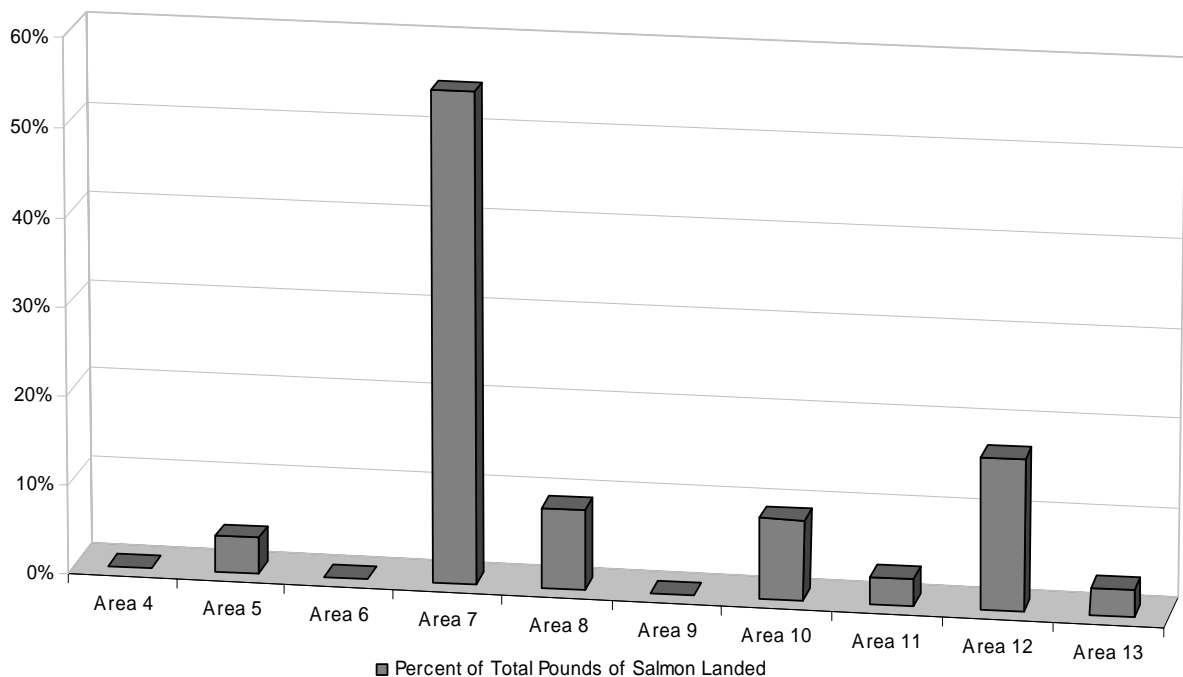
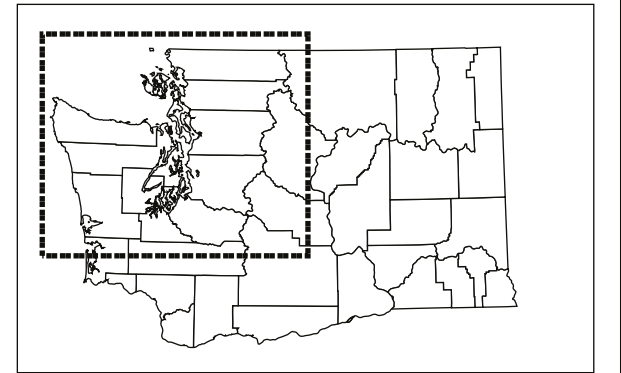
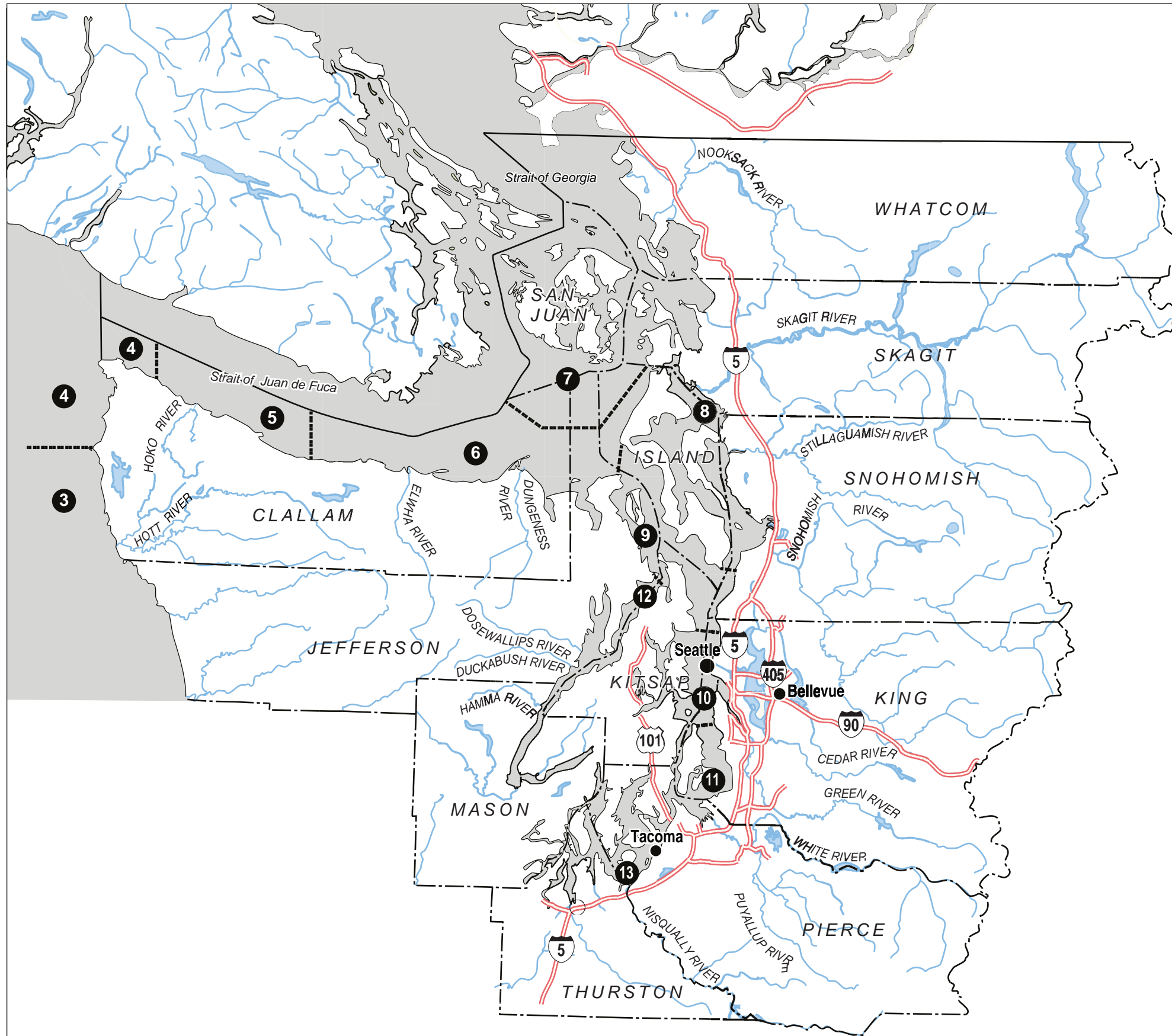


Figure 3.6-5 shows the annual average commercial harvest (both tribal and non-tribal) caught in freshwater areas of Puget Sound, most of which is tribal harvest. The Skagit River system accounted for 29 percent of the commercial harvest in freshwater areas between 1991 and 2000. The next most productive freshwater areas included the Nisqually (16%), Nooksack-Samish River (14%), Green-

- 1 Duwamish River (14%), and the Puyallup River (14%). In terms of species taken (see Economics Table
- 2 D-4 in Appendix D), chum salmon accounted for the largest share (about 41%) of the commercial
- 3 harvest (pounds landed) in freshwater areas, followed by coho (29%), chinook (18%), pink (12%), and
- 4 sockeye (less than 1%).



Legend

- 5** Sport and Commercial Fishing Catch Areas
- 100,00 - 250,000 Population
- > 500,000 Population

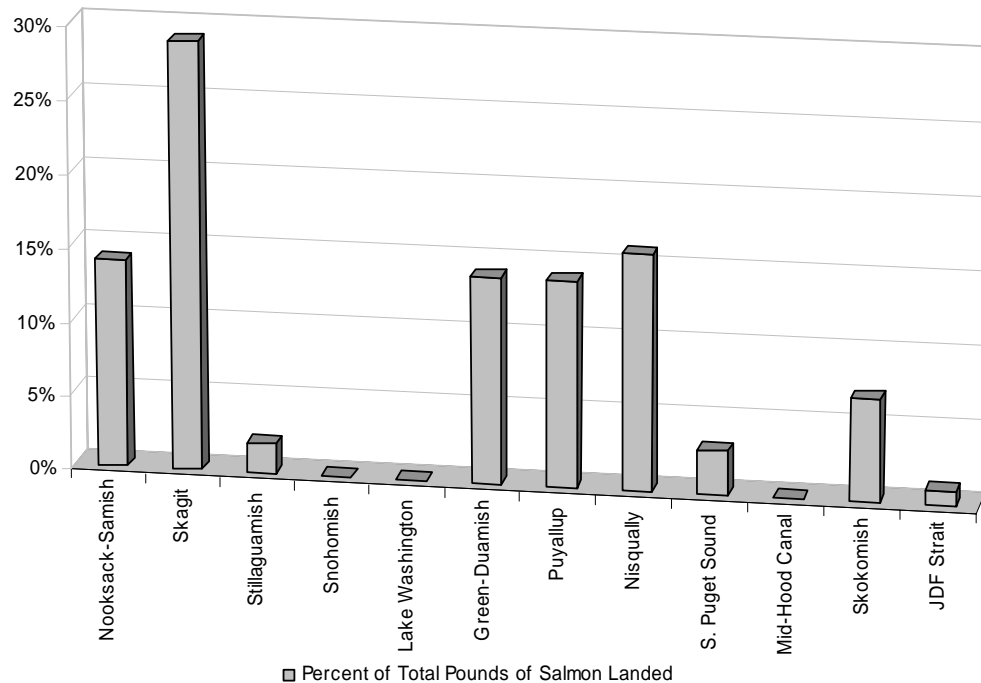


20 10 0 10 20

Scale in Miles

Figure 3.6-4.
Action and impact analysis area
for the Puget Sound Chinook Harvest
Resource Management Plan.

1 Figure 3.6-5. Percent of annual average commercially-caught (tribal and non-tribal) harvest of salmon
2 in freshwater areas of Puget Sound.



3 The number of non-tribal licenses issued for commercial salmon fishing in Puget Sound has declined
4 each year over the period 1991 through 2000, with the exception of the year 2000 when the same
5 number of permits were issued as in 1999 (see Economics Table D-5 in Appendix D). In 1991, 1,512
6 licenses were issued for commercial salmon fishing in Puget Sound, of which about 94 percent were
7 issued to Washington residents. By 2000, the number of licenses issued had declined to 987, of which
8 about 96 percent were issued to Washington residents.

9 To evaluate the regional effects of fishing activity, counties that border Puget Sound are grouped into
10 three regions: North Puget Sound, consisting of Whatcom, Skagit, Snohomish, Island and San Juan
11 counties; South Puget Sound/South Hood Canal, consisting of King, Pierce, Thurston, Mason, and
12 Kitsap counties; and the Strait of Juan De Fuca/North Hood Canal, consisting of Clallam and Jefferson
13 counties (see Figure 3.2-2). About 56 percent of the 9.9 million pounds of salmon landed in 2001 was
14 taken by commercial fishermen who live in the North Puget Sound region, and about 38 percent of the
15 pounds landed was taken by commercial fishermen who live in the South Puget Sound/Hood Canal
16 region (see Economics Table D-6 in Appendix D). Commercial fishermen who reside in the Strait of
17 Juan de Fuca/North Hood Canal region accounted for about 4 percent of the salmon harvested in 2001,

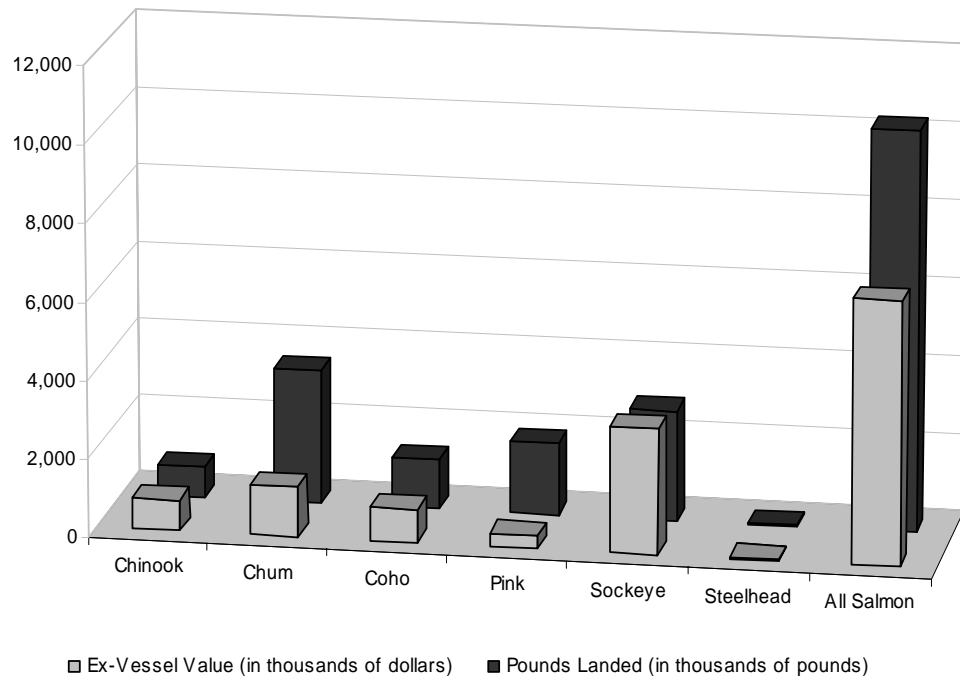
1 and residents from outside the Puget Sound region accounted for the remaining 2 percent of the salmon
2 harvest in 2001.

3 The economic value of the Puget Sound commercial salmon fishery can be measured in terms of its
4 monetary value to producers and consumers. Producers include the commercial fishers, including
5 operators (or permit holders) and crewmembers, and fish processors. Consumers include the public that
6 consumes salmon. Revenues received by the commercial fishers for their harvest represent gross
7 economic value, also referred to as ex-vessel value. Net economic value is the amount of total revenues
8 received by the vessel operators less the costs of production, including wages, operational expenses
9 such as fuel and equipment, and fixed costs such as insurance and depreciation.

10 As discussed in a 1988 study of the economic value of non-tribal salmon fisheries (Washington
11 Department of Community Development 1988), many non-tribal commercial fishermen fishing for
12 salmon in Puget Sound are part-time or occasional fishermen and operate at a loss, indicating negative
13 net economic values. In some cases, the operating losses associated with salmon fishing are offset by
14 profits from fishing for non-salmon species. Based on a literature review of existing studies (National
15 Marine Fisheries Service [NMFS] 2002), the net economic value of commercial salmon fishing along
16 the West Coast ranges from about 7 percent to about 53 percent of the ex-vessel value. These values
17 reflect “average” conditions over different time periods and across different gear types and species.
18 Recent analyses of net economic values for commercial salmon fisheries in the Pacific Northwest
19 prepared by The Research Group (~~personal communication with Hans Radtke—pers. comm.~~, The
20 Research Group, October 21, 2003) indicate that net economic values for commercial salmon fishing
21 and processing are roughly 50 percent of the ex-vessel value for harvesting and 20 percent of the ex-
22 vessel value for processing. These estimates also represent averages across different vessel types and
23 species. Based on the average annual ex-vessel value of \$12.2 million for salmon commercially-caught
24 (both tribal and non-tribal) in Puget Sound over the 10-year period 1991 through 2000, the net
25 economic value is estimated at \$8.5 million.

26 The net economic value to consumers of the Puget Sound salmon fishery is represented by the effect of
27 harvesting Puget Sound salmon on salmon prices. Based on a literature review conducted for a 2002
28 study (National Marine Fisheries Service 2002), reductions in the supply of commercially-caught
29 salmon have been found to affect the price of salmon to consumers; however, this effect depends on
30 many factors, including the quantity of change in supply.

1 Figure 3.6-6. Annual average catch and ex-vessel value of salmon harvested by tribes in Puget Sound
2 (1991-2000).



3 In summary, the annual ex-vessel value of salmon commercially-caught (tribal and non-tribal) in Puget
4 Sound averaged about \$12.2 million over the 10-year period between 1991 and 2000. This value
5 represents about 75 percent of the ex-vessel value of all salmon landed at ports in the Puget Sound area;
6 salmon caught elsewhere, including Alaska and Canada, also are landed at ports in the Puget Sound
7 area. The value of the Puget Sound commercial salmon fishery has declined sharply over the 10-year
8 period, from \$24.4 million in 1991 to \$5.9 million in 2000. Sockeye salmon is the most valuable
9 salmon fishery to both tribal and non-tribal commercial fishermen, accounting for about 50 percent of
10 the annual average value to tribal fishermen, and about 57 percent to non-tribal commercial fishermen.
11 About 83 percent of salmon landings by non-tribal commercial fishermen is caught using purse seines.
12 Of the salmon caught in the marine waters of Puget Sound, about 57 percent are caught in Marine
13 Catch Area 7; about 29 percent of salmon caught in fresh waters around the Puget Sound are caught in
14 the Skagit River system. The net economic value of the annual average harvest of Puget Sound salmon
15 between 1991 and 2000 is estimated at \$8.5 million.

3.6.1.2 Processing of Commercial Salmon Catch

Salmon processing in the Puget Sound region, as well as within Washington as a whole, consists primarily of cleaning, gutting, heading, and icing operations, and, to a much lesser extent, smoking and curing operations (Washington Department of Community Development 1988). Salmon canneries have not operated in the region since the early 1990s, with the exception of small, speciality operations focused on pink salmon (personal communication with Richard Ranta, National Marine Fisheries Service, April 4, 2003).

Processors and buyers of salmon include persons who purchase salmon from tribal and non-tribal commercial fishermen, and either process the product themselves or sell it to a third party for processing. Based on information compiled by the Pacific Fishery Management Council (1999), about 195 processors/buyers operated in the Puget Sound region and purchased salmon between 1994 and 1998. King County and Whatcom County had the largest number of reported processors/buyers, with 33 and 29 processors/buyers, respectively. Other counties in the Puget Sound region with a significant number of processors/buyers include Clallam County (27), Pierce County (23), Mason County (16), and Skagit, and Snohomish counties (each with 14 processors/buyers).

During 2002, 127 tribal and non-tribal buyers of salmon purchased 23 million pounds of salmon directly from Puget Sound gillnet and purse seine vessels. The top seven buyers (all of whom purchased at least one million pounds of salmon) accounted for 62 percent of the purchases. According to industry representatives, the number of buyers has declined over the years because of heavy Alaska production and poor market conditions. At least one major buyer did not operate in 2002 (personal communication with Stephen Freese, National Marine Fisheries Service, March 14, 2003).

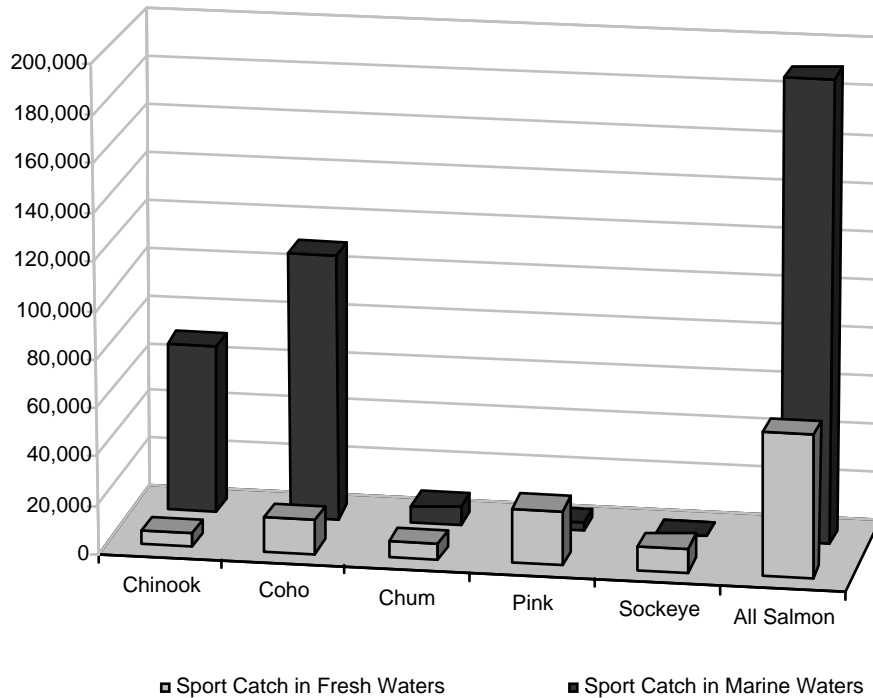
Additional information on the contribution made by processors and buyers to the regional economies is described in Subsection 3.6.3, Regional Economic Activity.

3.6.2 Sport Fishing Activity, Catch, and Value

Sport fishing for salmon and steelhead is a very popular recreational activity in the Puget Sound region. Between 1991 and 2000, the number of sport fishing trips for salmon and steelhead averaged about 578,000 trips annually (see Economics Table D-10 in Appendix D). The most popular areas are, in descending order of popularity, Marine Catch Areas 11, 5, 10, 9, and 8. (Marine Catch Areas are identified on Figure 3.6-3.) The number of sport fishing trips for salmon and steelhead declined substantially over the 10-year period, with an estimated 923,700 trips taken in 1991, decreasing to only 319,200 trips taken in the year 2000.

Figure 3.6-7 shows the annual average catch of salmon by species in marine and freshwater areas of Puget Sound between 1991 and 2000. About 76 percent of all fish caught by sport anglers were in marine waters. In terms of the distribution by salmon species, chinook and coho salmon are the primary species caught by sport anglers, and are predominantly caught in the marine waters of Puget Sound, whereas pink, chum salmon, and sockeye salmon are predominantly caught in freshwater areas.

1 Figure 3.6-7. Annual average sport catch (number of fish caught) of salmon in marine and freshwater
2 areas of Puget Sound, by species (1991-2000).



3 Economics Table D-12 in Appendix D shows the proportion of the 2001 sport catch of salmon in
4 marine waters of Puget Sound caught by anglers who reside in the three regions of the Puget Sound
5 Action Area, and from outside the area. As shown, 52 percent of the 2001 sport catch of salmon was
6 taken by anglers who live within the South Puget Sound/South Hood Canal region, and about 30
7 percent was caught by anglers who reside in the North Puget Sound region. Major launching areas and
8 marinas used by anglers in the three regions are shown on Figure 3.6-8 (North Puget Sound), Figure
9 3.6-9 (South Puget Sound/South Hood Canal), and Figure 3.6-10 (Strait of Juan de Fuca/North Hood
10 Canal).

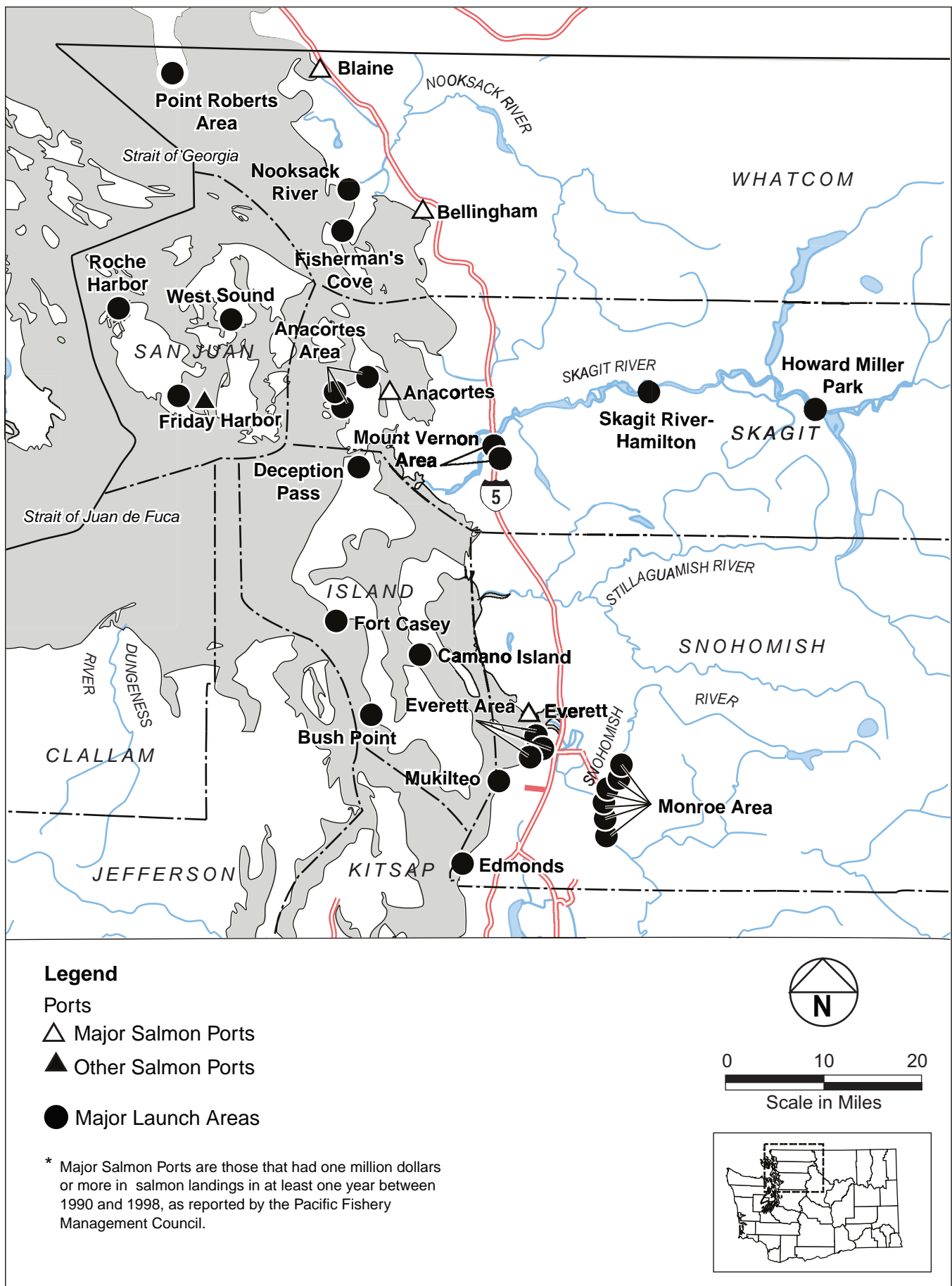


Figure 3.6-8. Salmon ports and major launch areas in North Puget Sound region.

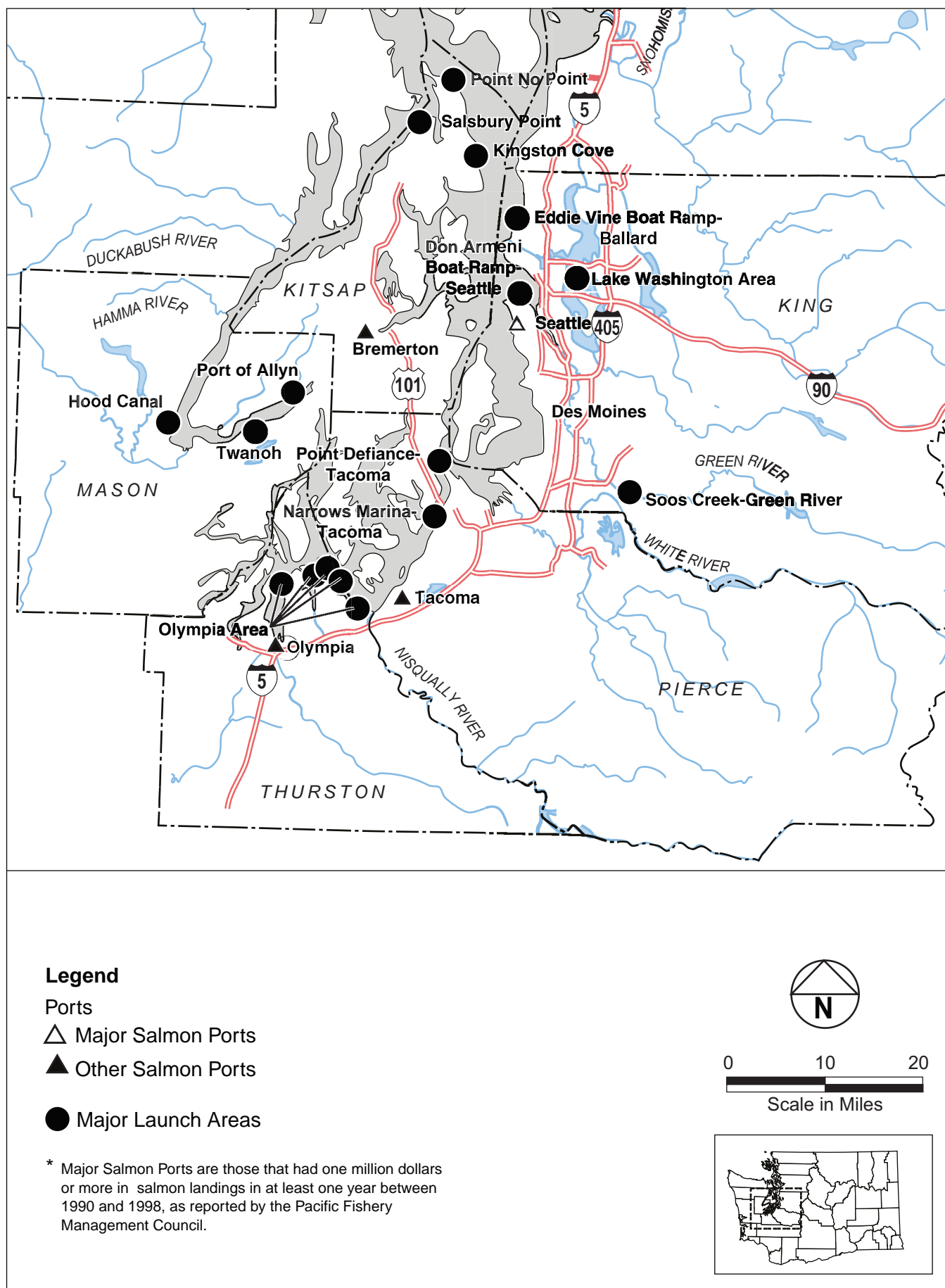


Figure 3.6-9. Salmon ports and major launch areas in South Puget Sound/South Hood Canal region.

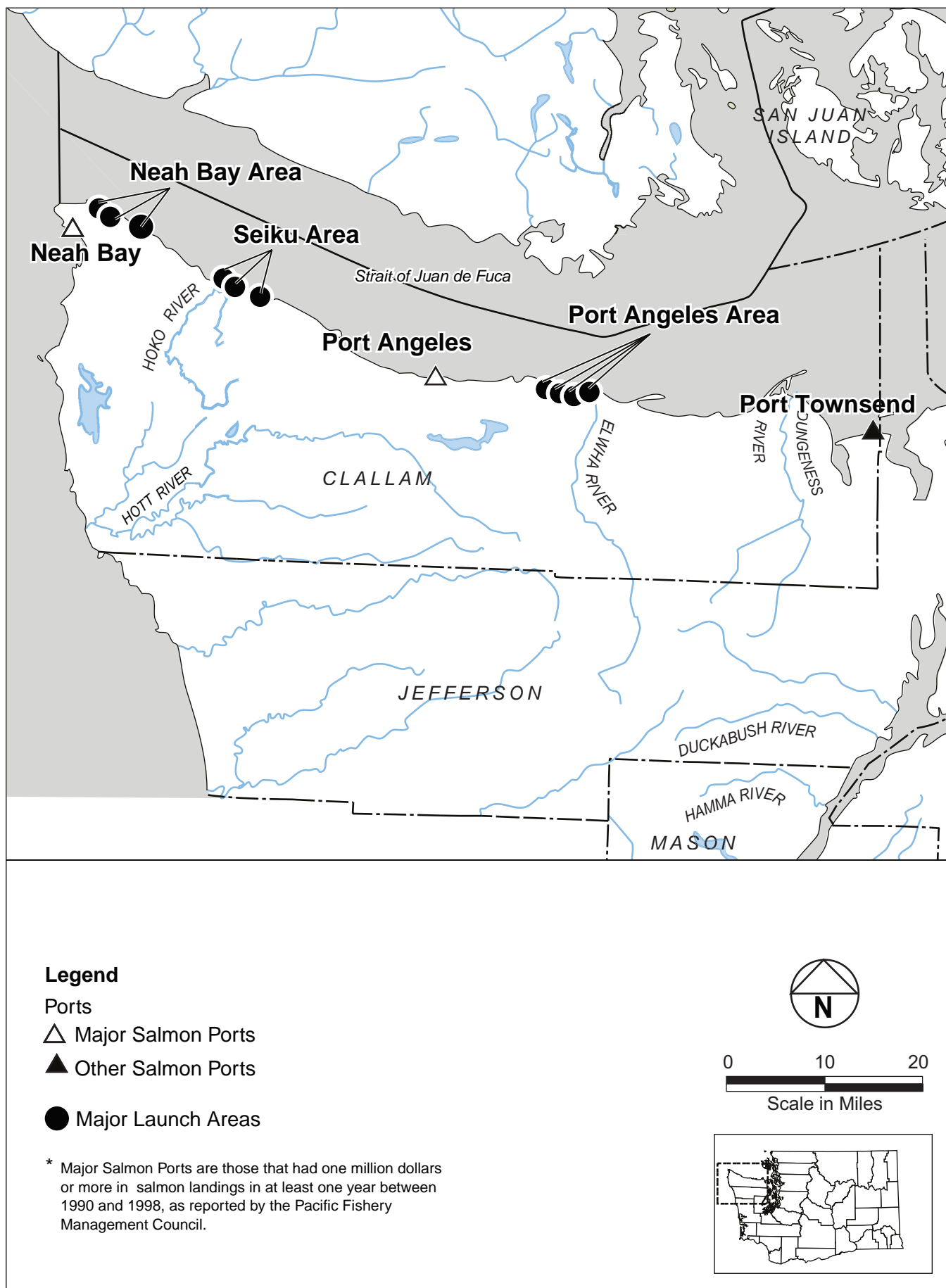


Figure 3.6-10. Salmon ports and major launch areas in the Strait of Juan de Fuca/North Hood Canal region.

1 Similar to the commercial salmon fishery, the economic value of the Puget Sound sport salmon fishery
2 can be measured by the value it generates for consumers and producers. Consumers include sport
3 anglers that engage in salmon fishing, both in marine waters and fresh waters. Producers are those
4 businesses that provide goods and services to anglers participating in salmon sport fishing, including
5 guides, charter boat operators, and other businesses such as bait and tackle stores, lodging places, food
6 stores and restaurants, and miscellaneous retail stores.

7 Even though sport-caught salmon do not have a market price, the value to anglers can be measured by
8 their willingness to pay (WTP) for fishing trips. Willingness to pay includes what anglers actually pay
9 (i.e., angler spending) plus the additional amount that they would be willing to pay to continue sport
10 fishing for salmon. The amount that anglers would be willing to pay over and above what they actually
11 pay measures the net economic value (or the value received) to anglers. The net economic value of the
12 sport fishery to producers (e.g., charter boat operators, guides, and other sport fishing-related
13 businesses) can be measured by the net income (or profit) generated by sales to recreational anglers.

14 Based on two previous studies (The Research Group 1991 and Gentner et al. 2001) of expenditures
15 associated with sport fishing in marine and fresh waters in the Pacific Northwest, spending by anglers
16 who sport fish for salmon and steelhead *in marine waters* of Puget Sound is estimated to average about
17 \$55 per angler day for fishing from the shore, \$50 per angler day for fishing from private boats, and
18 \$156 per angler day for fishing from charter boats (in 2000 dollars). Expenditures associated with sport
19 fishing for salmon and steelhead *in fresh waters* of Puget Sound are estimated at about \$66 per angler
20 day. Based on the average number of sport fishing trips (assumed to be equivalent to angler days) taken
21 during the period 1991 through 1998 (578,000 trips, roughly split evenly between marine and fresh
22 waters), annual trip-related spending associated with sport fishing for salmon and steelhead in the
23 Puget Sound area averaged \$35.1 million. Washington-resident anglers are estimated to account for
24 about 95 percent of all sport fishing for salmon and steelhead in Puget Sound.

25 As indicated above, the net economic value of the recreational salmon fishery is comprised of the
26 additional (or net) willingness by anglers to pay to fish for salmon, plus the net income to charter boat
27 operators, guides, and other businesses that provide goods and services to recreational anglers. Based
28 on a study of sport fishing for salmon and steelhead in the Pacific Northwest (Olsen et al. 1991), the net
29 economic value of sport fishing for salmon and steelhead in Puget Sound waters (including tributaries)
30 was estimated at about \$47 per angler day (in 1989 dollars). When adjusted to 2000 dollars using the
31 consumer price index, this dollar amount is \$65 per angler day. Based on the average number of sport
32 fishing trips (assumed to be equivalent to angler days) taken between 1991 and 2000 (578,000 trips),

the annual average net economic value associated with sport fishing for salmon and steelhead in Puget Sound waters is estimated at \$37.6 million. The annual average net income to sport fishing-related businesses is estimated at \$6.5 million, based on angler spending of \$35.1 million and an average net income coefficient (derived from the Impact Model for Planning [IMPLAN] data for the Puget Sound Region) of 18.4 percent for sport fishing-related businesses. This profit margin overestimates, to a limited extent, the net income to sport fishing-related businesses because the coefficient used in the calculation includes sources of income such as rents and dividends that are not directly related to sales of sport fishing-related goods and services.

In summary, the number of sport fishing trips for salmon and steelhead in Puget Sound waters averaged about 578,000 trips annually between 1991 and 2000. The number of trips declined sharply over the 10-year period, from 923,700 trips in 1991 to 319,200 in 2000. Chinook and coho salmon are the primary species caught by sport anglers, and these are predominantly caught in marine waters of Puget Sound. Anglers who reside in the South Puget Sound/South Hood Canal region caught about 52 percent of the 2001 sport catch of salmon; anglers who reside in the North Puget Sound region caught about 30 percent of the 2001 sport catch of salmon; anglers who reside in the Strait of Juan de Fuca/North Puget Sound region caught about 9 percent of the 2001 sport catch of salmon; and persons who live outside the Puget Sound region caught the remaining 9 percent of the catch. Trip-related spending by sport anglers fishing for salmon and steelhead in the Puget Sound area is estimated to average about \$35.1 million annually between 1991 and 2000. The net benefits to anglers of sport fishing for salmon and steelhead in the Puget Sound area are estimated to have averaged about \$37.6 million annually between 1991 and 2000. Net income to sport fishing-related businesses is estimated to have averaged about \$6.5 million annually between 1991 and 2000.

3.6.3 Regional Economic Activity

This section describes the level of economic activity within the Strait of Juan de Fuca/North Hood Canal region, North Puget Sound region, South Puget Sound/South Hood Canal region, and the action area as a whole to provide context for evaluating the effects of commercial and sport fishing for salmon in Puget Sound. Economic activity in these three regions is characterized by levels of industrial output, employment, and personal income. As shown in Tables 3.6-1 through 3.6-6, economic data are presented for major industrial sectors and for the individual industrial sectors that would be most affected by changes in sport fishing activity and commercial fishing/processing that would result from the Proposed Action or alternatives. Economic conditions are characterized using 2000 data available from secondary sources through the IMPLAN economic input-output model database (Minnesota

IMPLAN Group 2002). The underlying sources for the IMPLAN data generally include U.S. Department of the Census County Business Patterns data, U.S. Department of Labor ES-202 data, and Bureau of Economic Analysis Regional Economic Information System data (Minnesota IMPLAN Group 2000).

3.6.3.1 Strait of Juan de Fuca/North Hood Canal Region

Clallam County and Jefferson County border the Strait of Juan de Fuca and North Hood Canal and comprise this region of the Puget Sound Action Area. As shown in Table 3.6-1, the Strait of Juan de Fuca/North Hood Canal region generated \$3.5 billion in industrial output (i.e., sales of goods and services) in 2000, which accounted for about 0.9 percent of statewide industrial output. Manufacturing; services; and finance, insurance, and real estate (FIRE) were dominant within the Strait of Juan de Fuca/North Hood Canal region sectors, together accounting for 54 percent of total regional output in 2000. Among the specific sectors potentially affected by the Proposed Action or alternatives (Table 3.6-2), the eating and drinking places sector was the largest, generating \$102.4 million in revenue in 2000. The commercial fishing and fish/seafood processing (i.e., canned and cured seafood and prepared fresh or frozen fish or seafood) sectors generated \$37.7 million and \$15.8 million, respectively, in output, together representing 1.5 percent of industrial output in the Strait of Juan de Fuca/North Hood Canal region.

In 2000, employment within the Strait of Juan de Fuca/North Hood Canal region, including full- and part-time jobs, totaled about 45,500 jobs (Table 3.6-3), representing 1.8 percent of total employment within the three regions and 1.3 percent of statewide employment. Among major industrial sectors, the largest employers included the services sector (29.6% of regional employment), and the wholesale and retail trade sector (20.8%). Among the potentially affected sectors, eating and drinking places provided 6.7 percent of jobs in the Strait of Juan de Fuca/North Hood Canal region, and food stores generated 3.6 percent of jobs in this region (Table 3.6-4). Commercial fishing and fish/seafood processing generated 449 and 110 jobs, respectively, together accounting for 1.2 percent of employment in the Strait of Juan de Fuca/North Hood Canal regional economy.

As measured by employee compensation, proprietary income (i.e., payments received by self-employed persons as income), and other property income (i.e., payments from interest, rents, royalties, dividends, and corporate profits), the Strait of Juan de Fuca/North Hood Canal region-wide income totaled almost \$1.9 billion in 2000 (Table 3.6-5), with the majority of the income produced by the government, FIRE, and services sectors. Among the potentially affected sectors, the food stores sector and eating and

drinking places sector together accounted for \$99.2 million in income, or 5.4 percent of total income within the Strait of Juan de Fuca/North Hood Canal region (Table 3.6-6).

3.6.3.2 North Puget Sound

The North Puget Sound region includes Whatcom, Skagit, Snohomish, Island, and San Juan counties. As shown in Table 3.6-1, the North Puget Sound region generated \$52.2 billion in industrial output in 2000, which accounted for about 14 percent of statewide industrial output. Manufacturing was the dominant sector in the North Puget Sound region, producing 39 percent of its total output in 2000. Among the specific sectors potentially affected by the Proposed Action or alternatives, the eating and drinking places sector was the largest, generating \$1.0 billion in output (Table 3.6-2). The commercial fishing and fish/seafood processing sectors generated \$240.6 million and \$270.7 million, respectively, together representing about 1.0 percent of North Puget Sound regional output. Similar to the Strait of Juan de Fuca/North Hood Canal region, commercial fishing and processing in the North Puget Sound region are minor industries relative to the overall level of industrial output within the regional economy.

In 2000, employment within the North Puget Sound region totaled about 480,800 jobs (Table 3.6-3), representing 18.6 percent of total employment within the three-region action area and 13.4 percent of statewide employment. Among major industrial sectors, the largest employers included the services sector (25.1% of regional jobs), and the wholesale and retail trade sector (21.4%). Among the potentially affected sectors, eating and drinking places provided 5.9 percent of jobs within the North Puget Sound region, and the miscellaneous retail sector generated 3.3 percent of regional jobs (Table 3.6-4). Commercial fishing and fish/seafood processing generated 2,373 and 1,696 jobs, respectively, together accounting for 0.8 percent of North Puget Sound regional employment.

Regionwide, income totaled almost \$24.2 billion in 2000 (Table 3.6-5), with the majority of the income produced by the manufacturing, government, and FIRE sectors. Among the potentially affected sectors, the service stations and automobile dealers sector and the eating and drinking places sector together accounted for \$1.0 billion in income, or 4.2 percent of total income within the North Puget Sound region (Table 3.6-6).

3.6.3.3 South Puget Sound/South Hood Canal

Five counties comprise the South Puget Sound/South Hood Canal region: King, Pierce, Thurston, Mason, and Kitsap. As shown in Table 3.6-1, the South Puget Sound/South Hood Canal region generated \$194.1 billion in industrial output in 2000, representing 52.3 percent of statewide output. The

1 services and manufacturing sectors were dominant within the South Puget Sound/South Hood Canal
2 region, together accounting for about half of regional output in 2000. Among the specific sectors
3 potentially affected by the Proposed Action or alternatives, the eating and drinking places sector was
4 the largest, generating \$4.9 billion in output (Table 3.6-2). The commercial fishing and fish/seafood
5 processing sectors generated \$368.2 million and \$1.1 billion, respectively, in output, together
6 representing about 0.7 percent of total Puget Sound regional output. Similar to the Strait of Juan de
7 Fuca/North Hood Canal and North Puget Sound regions, commercial fishing and processing in the
8 South Puget Sound/South Hood Canal region are minor industries relative to the overall level of
9 industrial output within the regional economy.

10 In 2000, employment within the South Puget Sound/South Hood Canal region totaled nearly 2.1
11 million jobs (Table 3.6-3), representing 79.6 percent of total employment within the three regions of
12 the action area, and 57.3 percent of statewide employment. The largest employers among major
13 industrial sectors included the services sector (32.9% of regional jobs), and the wholesale and retail
14 trade sector (21.2%). Among the potentially affected sectors, eating and drinking places provided 5.2
15 percent of regional jobs, and the miscellaneous retail sector generated 4.0 percent of regional jobs
16 (Table 3.6-4). Commercial fishing and fish/seafood processing generated 3,345 and 5,312 jobs,
17 respectively, together accounting for 0.4 percent of South Puget Sound/South Hood Canal regional
18 employment.

Table 3.6-1. County, regional, and state industrial output by major industrial sector in 2000 (in millions of 2000 dollars).

Region/ County	Agriculture, Forestry and Fishing	Construction and Mining	Manufacturing	Transportation, Communications and Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate	Services	Government	Total
Strait of Juan de Fuca/North Hood Canal:									
Clallam	\$71.88	\$328.27	\$415.20	\$116.33	\$305.16	\$408.86	\$402.89	\$338.75	\$2,387.10
Jefferson	\$35.84	\$149.79	\$291.73	\$48.43	\$100.89	\$173.88	\$187.42	\$103.48	\$1,091.46
Total	\$107.72	\$478.06	\$706.93	\$164.76	\$406.05	\$582.74	\$590.31	\$442.23	\$3,478.56
North Puget Sound:									
Whatcom	\$448.16	\$1,200.06	\$4,085.56	\$484.51	\$1,065.76	\$1,081.40	\$1,326.03	\$484.29	\$10,175.77
Skagit	\$328.11	\$730.36	\$2,917.95	\$350.06	\$654.13	\$591.01	\$734.66	\$410.48	\$6,716.76
Snohomish	\$362.01	\$3,480.96	\$13,133.07	\$1,171.81	\$3,307.42	\$3,855.22	\$3,797.15	\$2,625.38	\$31,733.01
Island	\$32.68	\$311.01	\$111.37	\$94.47	\$225.90	\$572.44	\$358.71	\$1,128.86	\$2,835.44
San Juan	\$26.58	\$173.97	\$48.41	\$55.82	\$65.69	\$184.93	\$156.77	\$47.40	\$759.55
Total	\$1,197.54	\$5,896.36	\$20,296.36	\$2,156.67	\$5,318.9	\$6,285.00	\$6,373.32	\$4,696.41	\$52,220.53
South Puget Sound/South Hood Canal:									
King	\$890.28	\$13,526.95	\$35,840.25	\$16,252.61	\$25,882.38	\$26,220.05	\$45,958.83	\$9,925.25	\$174,495.60
Pierce	\$245.30	\$3,333.16	\$4,796.27	\$2,149.89	\$4,044.56	\$4,498.52	\$5,586.95	\$5,384.24	\$30,038.89
Thurston	\$186.61	\$904.87	\$896.60	\$566.50	\$1,513.75	\$1,307.32	\$1,737.58	\$2,297.11	\$9,410.33
Mason	\$53.86	\$166.79	\$352.71	\$53.40	\$149.94	\$237.88	\$190.21	\$217.01	\$1,421.79
Kitsap	\$145.39	\$943.97	\$372.15	\$381.52	\$994.76	\$1,240.29	\$1,739.94	\$2,963.14	\$8,781.16
Total	\$1,521.44	\$18,875.74	\$42,257.98	\$19,403.92	\$32,585.39	\$33,504.06	\$55,213.51	\$20,786.75	\$194,138.92
<i>Three-Region Total</i>	<i>\$2,826.7</i>	<i>\$25,250.16</i>	<i>\$63,261.27</i>	<i>\$21,725.35</i>	<i>\$38,3120.34</i>	<i>\$40,371.80</i>	<i>\$62,177.14</i>	<i>\$25,925.39</i>	<i>\$249,838.01</i>
Statewide Total	\$8,216.14	\$33,982.75	\$84,991.94	\$31,118.31	\$49,159.25	\$50,885.03	\$77,160.95	\$35,474.86	\$370,990.24

Source: Minnesota IMPLAN Group 2002.

Table 3.6-2. County, regional, and state industrial output by specific industrial sectors in 2000 (in millions of 2000 dollars).

Region/ County	Commercial Fishing	Canned and Cured Seafood	Prepared Fresh or Frozen Fish or Seafood	Food Stores	Service Stations and Automobile Dealers	Eating and Drinking Places	Miscellaneous Retail	Hotels and Lodging Places	Amusement and Recreation Services
Strait of Juan de Fuca/North Hood Canal:									
Clallam	\$24.88	\$0.66	\$10.90	\$49.56	\$41.98	\$67.17	\$26.12	\$27.15	\$25.54
Jefferson	\$12.79	\$0	\$4.23	\$21.98	\$9.96	\$35.19	\$8.24	\$19.15	\$5.06
Total	\$37.67	\$0.66	\$15.13	\$71.54	\$51.94	\$102.36	\$34.36	\$46.3	\$30.6
North Puget Sound:									
Whatcom	\$69.40	\$1.17	\$118.72	\$147.86	\$105.11	\$208.50	\$78.40	\$62.94	\$41.59
Skagit	\$48.89	\$16.02	\$81.10	\$64.65	\$144.65	\$136.96	\$59.96	\$26.28	\$67.08
Snohomish	\$105.40	\$10.91	\$38.89	\$353.59	\$597.03	\$624.97	\$269.64	\$50.20	\$156.06
Island	\$3.60	\$2.78	\$1.10	\$32.15	\$29.79	\$55.50	\$34.75	\$17.14	\$5.74
San Juan	\$13.28	\$0	\$0	\$16.58	\$3.11	\$19.51	\$8.91	\$60.97	\$5.08
Total	\$240.57	\$30.88	\$239.81	\$614.83	\$879.69	\$1,045.44	\$451.66	\$217.53	\$275.55
South Puget Sound/South Hood Canal:									
King	\$235.69	\$72.96	\$961.79	\$1,214.00	\$1,429.24	\$3,645.79	\$3,348.39	\$878.50	\$656.50
Pierce	\$36.66	\$0	\$7.04	\$347.09	\$655.68	\$757.96	\$327.75	\$79.22	\$187.12
Thurston	\$15.13	\$0.37	\$3.81	\$105.23	\$111.45	\$191.13	\$76.44	\$31.30	\$59.75
Mason	\$6.98	\$0	\$30.23	\$25.63	\$16.66	\$37.86	\$7.55	\$8.00	\$37.64
Kitsap	\$73.74	\$0.34	\$0.49	\$144.69	\$168.13	\$238.87	\$79.04	\$37.91	\$43.59
Total	\$368.20	\$73.67	\$1,003.36	\$1,836.64	\$2,381.16	\$4,871.61	\$3,839.17	\$1,034.93	\$984.60
Three-Region Total	\$646.44	\$105.21	\$1,258.30	\$2,523.01	\$3,312.79	\$6,019.41	\$4,325.19	\$1,298.76	\$1,290.75
Statewide Total	\$902.14	\$122.71	\$1,362.10	\$3,626.67	\$4,575.73	\$7,996.43	\$5,345.88	\$1,950.83	\$1,541.24

Source: Minnesota IMPLAN Group 2002.

Table 3.6-3. County, regional, and state employment¹ by major industrial sector in 2000.

Region/ County	Agriculture, Forestry and Fishing	Construction and Mining	Manufacturing	Transportation, Communications and Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate	Services	Government	Total
Strait of Juan de Fuca/North Hood Canal:									
Clallam	1,275	2,766	2,449	989	6,845	2,252	9,348	6,108	32,032
Jefferson	585	1,329	1,369	246	2,607	958	4,113	2,264	13,469
Total	1,860	4,095	3,818	1,235	9,452	3,210	13,461	8,372	45,501
North Puget Sound:									
Whatcom	5,397	9,307	10,227	3,329	21,410	5,647	26,517	11,714	93,549
Skagit	4,826	5,586	6,783	2,073	13,452	3,161	15,247	8,757	59,886
Snohomish	5,570	27,121	56,852	6,885	60,887	19,165	68,042	39,011	283,534
Island	873	2,692	898	501	5,664	2,839	7,840	13,095	34,403
San Juan	570	1,492	305	307	1,638	932	3,092	1,067	9,403
Total	17,236	46,198	75,065	13,095	103,051	31,744	120,738	60,633	480,775
South Puget Sound/South Hood Canal:									
King	14,649	98,028	155,447	83,631	317,774	114,394	507,713	165,824	1,457,460
Pierce	5,474	26,053	23,541	11,948	71,294	24,311	100,654	74,103	337,378
Thurston	3,133	7,391	4,658	2,874	21,191	6,497	31,246	42,911	119,901
Mason	680	1,422	2,233	447	3,476	1,305	4,553	3,780	17,896
Kitsap	1,898	7,633	2,984	2,363	21,608	6,761	31,760	44,093	119,100
Total	25,834	140,527	188,863	101,263	435,343	153,268	675,926	330,711	2,051,735
Three-Region Total	44,930	190,820	267,746	115,593	547,846	188,222	810,125	399,716	2,578,011
Statewide Total	137,115	261,023	371,402	156,152	762,495	245,736	1,084,962	564,136	3,583,022

Source: Minnesota IMPLAN Group 2002.

¹ Employment includes full- and part-time jobs.

Table 3.6-4. County, regional, and state employment¹ by specific industrial sectors in 2000.

Region/ County	Commercial Fishing	Canned and Cured Seafood	Prepared Fresh or Frozen Fish or Seafood	Food Stores	Service Stations and Automobile Dealers	Eating and Drinking Places	Miscellaneous Retail	Hotels and Lodging Places	Amusement and Recreation Services
Strait of Juan de Fuca/North Hood Canal:									
Clallam	286	7	74	1,102	714	1,995	911	642	801
Jefferson	163	0	29	531	158	1,056	364	420	203
Total	449	7	103	1,633	872	3,051	1,275	1,062	1,004
North Puget Sound:									
Whatcom	779	11	742	2,911	1,715	5,973	2,912	1,155	1,574
Skagit	557	135	485	1,498	1,852	3,812	2,151	573	1,954
Snohomish	843	80	212	7,580	6,844	16,500	9,176	978	4,583
Island	44	24	7	756	405	1,664	1,416	374	244
San Juan	150	0	0	388	54	514	330	1,101	256
Total	2,373	250	1,446	13,133	10,870	28,463	15,985	4,181	8,611
South Puget Sound/South Hood Canal:									
King	2,110	491	4,562	21,606	14,468	74,215	65,481	13,040	22,175
Pierce	424	0	56	7,333	7,317	20,184	10,948	1,535	5,933
Thurston	196	3	25	2,350	1,469	5,233	2,711	571	1,874
Mason	92	0	169	574	301	1,109	348	211	1,065
Kitsap	523	3	3	3,077	2,258	6,605	3,078	801	1,435
Total	3,345	497	4,815	34,940	25,813	107,346	82,566	16,158	32,482
<i>Three-Region Total</i>	<i>6,167</i>	<i>754</i>	<i>6,364</i>	<i>49,706</i>	<i>37,555</i>	<i>138,860</i>	<i>99,826</i>	<i>21,401</i>	<i>42,097</i>
Statewide Total	9,315	889	7,015	75,619	56,009	194,661	133,101	34,303	52,370

Source: Minnesota IMPLAN Group 2002.

¹ Employment includes full- and part-time jobs.

Table 3.6-5. County, regional, and state personal income¹ by major industrial sector in 2000 (in millions of 2000 dollars).

Region/ County	Agriculture, Forestry and Fishing	Construction and Mining	Manufacturing	Transportation, Communications and Utilities	Wholesale and Retail Trade	Finance, Insurance and Real Estate	Services	Government	Total
Strait of Juan de Fuca/North Hood Canal:									
Clallam	\$58.75	\$117.00	\$151.82	\$49.44	\$180.06	\$247.40	\$221.22	\$288.63	\$1,314.32
Jefferson	\$23.38	\$48.50	\$89.34	\$25.89	\$58.38	\$106.15	\$92.28	\$92.16	\$536.05
Total	\$82.13	\$165.5	\$241.16	\$75.33	\$238.44	\$353.55	\$313.50	\$380.79	\$1,850.37
North Puget Sound:									
Whatcom	\$167.30	\$472.98	\$778.74	\$218.26	\$618.56	\$651.13	\$747.19	\$421.89	\$4,076.24
Skagit	\$166.43	\$190.71	\$526.55	\$154.03	\$380.02	\$356.08	\$433.05	\$365.09	\$2,888.42
Snohomish	\$205.63	\$1,365.10	\$4,070.20	\$552.80	\$1,937.45	\$2,322.69	\$2,172.78	\$2,217.95	\$14,844.58
Island	\$20.50	\$104.93	\$43.79	\$47.74	\$132.57	\$354.45	\$190.23	\$1,075.12	\$1,969.34
San Juan	\$22.33	\$59.60	\$16.16	\$27.40	\$39.92	\$113.03	\$80.83	\$40.86	\$400.13
Total	\$582.19	\$2,193.32	\$5,435.44	\$1,000.23	\$3,108.52	\$3,797.38	\$3,624.08	\$4,120.91	\$24,178.71
South Puget Sound/South Hood Canal:									
King	\$613.02	\$5,691.66	\$12,399.57	\$8,161.81	\$14,965.09	\$15,866.53	\$31,608.10	\$8,418.53	\$97,724.30
Pierce	\$166.07	\$1,300.58	\$1,607.93	\$959.54	\$2,338.59	\$2,651.81	\$3,299.57	\$4,757.66	\$17,081.74
Thurston	\$88.11	\$335.22	\$287.89	\$277.29	\$923.54	\$794.75	\$1,025.08	\$2,179.09	\$5,910.96
Mason	\$25.46	\$57.55	\$128.80	\$24.64	\$87.88	\$146.51	\$107.87	\$176.72	\$755.43
Kitsap	\$112.10	\$353.18	\$130.52	\$191.91	\$588.59	\$747.46	\$963.30	\$2,823.69	\$5,910.74
Total	\$1,004.76	\$7,738.19	\$14,554.71	\$9,615.19	\$18,903.69	\$20,207.06	\$37,003.92	\$18,355.69	\$127,382.17
Three-Region Total	\$1,669.08	\$10,097.01	\$20,231.31	\$10,690.75	\$22,250.65	\$24,357.99	\$40,941.50	\$22,857.39	\$153,411.25
Statewide Total	\$4,175.18	\$13,435.35	\$26,996.56	\$14,959.04	\$28,509.56	\$30,744.60	\$49,595.20	\$30,217.67	\$198,633.15

Source: Minnesota IMPLAN Group 2002.

¹ Personal income includes employee compensation, proprietor income, and other property income.

Table 3.6-6. County, regional, and state personal income¹ by specific industrial sectors in 2000 (in millions of 2000 dollars).

Region/ County	Commercial Fishing	Canned and Cured Seafood	Prepared Fresh or Frozen Fish or Seafood	Food Stores	Service Stations and Automobile Dealers	Eating and Drinking Places	Miscellaneous Retail	Hotels and Lodging Places	Amusement and Recreation Services
Strait of Juan de Fuca/North Hood Canal:									
Clallam	\$22.60	\$0.04	\$1.44	\$37.15	\$25.04	\$29.96	\$16.39	\$14.05	\$14.91
Jefferson	\$11.63	\$0.00	\$0.51	\$16.48	\$5.94	\$15.60	\$5.17	\$10.07	\$2.83
Total	\$34.23	\$0.04	\$1.95	\$53.63	\$30.98	\$45.56	\$21.56	\$24.12	\$17.74
North Puget Sound:									
Whatcom	\$24.91	\$0.18	\$22.45	\$110.85	\$62.69	\$95.01	\$49.18	\$34.16	\$23.50
Skagit	\$44.40	\$3.22	\$17.79	\$48.47	\$86.27	\$63.42	\$37.62	\$13.83	\$39.60
Snohomish	\$95.50	\$3.24	\$10.89	\$265.09	\$356.07	\$297.54	\$169.15	\$26.98	\$92.02
Island	\$3.28	\$0.49	\$0.25	\$24.10	\$17.76	\$24.62	\$21.80	\$9.02	\$3.16
San Juan	\$12.06	\$0.00	\$0.00	\$12.43	\$1.86	\$9.30	\$5.59	\$33.18	\$2.69
Total	\$180.15	\$7.13	\$51.38	\$460.94	\$524.65	\$489.89	\$283.34	\$117.17	\$160.97
South Puget Sound/South Hood Canal:									
King	\$213.68	\$25.20	\$347.16	\$910.16	\$852.41	\$1,936.09	\$2,100.67	\$491.64	\$378.69
Pierce	\$33.30	\$0.00	\$1.70	\$260.22	\$391.05	\$359.28	\$205.61	\$42.61	\$109.06
Thurston	\$13.76	\$0.09	\$0.55	\$78.89	\$66.47	\$89.29	\$47.96	\$17.01	\$34.89
Mason	\$6.35	\$0.00	\$7.97	\$19.22	\$9.94	\$17.03	\$4.74	\$4.04	\$22.31
Kitsap	\$105.07	\$0.05	\$0.07	\$108.48	\$100.27	\$111.01	\$49.58	\$20.08	\$25.25
Total	\$372.16	\$25.34	\$357.45	\$1,376.97	\$1,420.14	\$2,512.70	\$2,408.56	\$575.38	\$570.20
Three-Region Total	\$586.54	\$32.51	\$410.78	\$1,891.54	\$1,975.77	\$3,048.15	\$2,713.46	\$716.67	\$748.91
Statewide Total	\$818.70	\$37.04	\$428.19	\$2,718.95	\$2,728.99	\$3,956.59	\$3,353.77	\$1,066.14	\$888.12

Source: Minnesota IMPLAN Group 2002.

¹ Personal income includes employee compensation, proprietor income, and other property income.

1 Total income within the South Puget Sound/South Hood Canal region was almost \$127.4 billion in
2 2000 (Table 3.6-5), with the majority produced by the services, FIRE, and wholesale and retail trade
3 sectors. Among the potentially affected sectors, the eating and drinking places sector and the
4 miscellaneous retail sector together accounted for \$4.9 billion in income, or 3.9 percent of total income
5 within the South Puget Sound/South Hood Canal region (Table 3.6-6).

6 **3.6.3.4 Three-Region Summary**

7 Together, the three regions (Strait of Juan de Fuca/North Hood Canal, North Puget Sound, and South
8 Puget Sound/South Hood Canal) generate a substantial portion of Washington's total industrial output.
9 Led by the manufacturing and services sectors, the three regions generated a total of \$249.8 billion in
10 output in 2000, accounting for more than two-thirds of the statewide total (Table 3.6-1). Among the
11 sectors potentially affected by the Proposed Action or alternatives within the three-region action area,
12 the eating and drinking places sector was the largest in the year 2000, generating \$6.0 billion in output,
13 representing 75.3 percent of the sector's statewide output (Table 3.6-2). The commercial fishing sector
14 in the three-region action area generated output valued at \$646.4 million, representing 71.7 percent of
15 the statewide total, and the area's fish/seafood processing sector produced \$1.3 billion in output, or
16 91.8 percent of the state's total output for that sector.

17 Industries within the three-region action area provided about 2.6 million jobs in 2000, accounting for
18 72.0 percent of Washington's total employment (Table 3.6-3). The leading major employment sector
19 within the three-region area was the services sector, generating 31.4 percent of all jobs within the three-
20 region area. Within the employment sectors potentially affected by the Proposed Action or alternatives,
21 key employment sectors include the eating and drinking places sector, producing 5.3 percent of total
22 jobs within the three-region action area, and the miscellaneous retail sector, generating 3.9 percent of
23 jobs (Table 3.6-4). Commercial fishing within the three-region action area provided 6,167 jobs in 2000,
24 an amount that represented two-thirds of statewide commercial fishing jobs. The fish/seafood
25 processing sector within the three-region action area produced 7,128 jobs, or 90.2 percent of the state's
26 total fish/seafood processing jobs.

27 The three-region action area generated \$153.4 billion in income in 2000, with the services, FIRE, and
28 government sectors producing the majority of the income (Table 3.6-5). Income generated within the
29 three-region action area accounted for 77.2 percent of statewide income. For the potentially affected
30 sectors, eating and drinking places and miscellaneous retail businesses together generated 3.8 percent
31 of total income within the three-region action area.

1 In summary, the three regions in the Puget Sound Action Area (Strait of Juan de Fuca/North Hood
2 Canal, North Puget Sound, and South Puget Sound/South Hood Canal) account for 67 percent of
3 statewide output of goods and services (industrial output). The Strait of Juan de Fuca/North Hood
4 Canal region accounts for 1.8 percent of the employment within the three-region action area.
5 Manufacturing, services, and the FIRE sector are the major sectors within the Strait of Juan de
6 Fuca/North Hood Canal region; the commercial fishing and fish/seafood processing sectors comprise
7 about 1.5 percent of the industrial output of the Strait of Juan de Fuca/North Hood Canal region. The
8 North Puget Sound region accounts for 18.7 percent of the employment within the three-region action
9 area. Manufacturing is the dominant sector within the North Puget Sound region, accounting for 39
10 percent of the region's industrial output; the commercial fishing and fish/seafood processing sectors
11 comprise about 1.0 percent of the industrial output of the North Puget Sound region. The South Puget
12 Sound/South Hood Canal region accounts for 79.6 percent of the employment within the three-region
13 action area. The services and manufacturing sectors are the major sectors within the South Puget
14 Sound/South Hood Canal region; the commercial fishing and fish/seafood processing sectors comprise
15 about 0.7 percent of the industrial output of the South Puget Sound/South Hood Canal region.